SGS-THOMSON MICROELECTRONICS

# L7900 SERIES

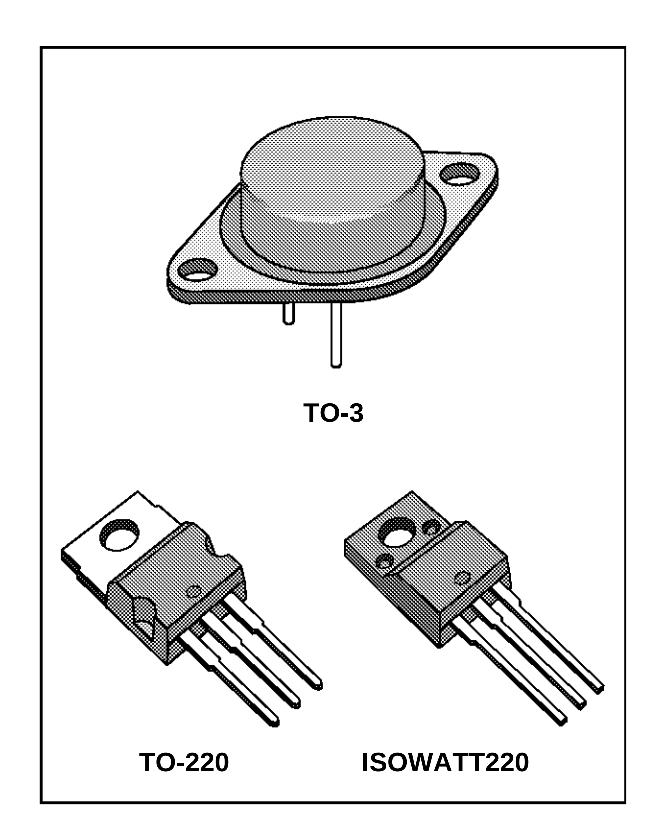
## NEGATIVE VOLTAGE REGULATORS

- OUTPUT CURRENT UP TO 1.5A
- OUTPUT VOLTAGES OF – 5; – 5.2; -6; – 8; – 12 ; – 15; –18; – 20; – 22; – 24V
- THERMAL OVERLOAD PROTECTION
- SHORT CIRCUIT PROTECTION
- OUTPUT TRANSISTOR SOA PROTECTION

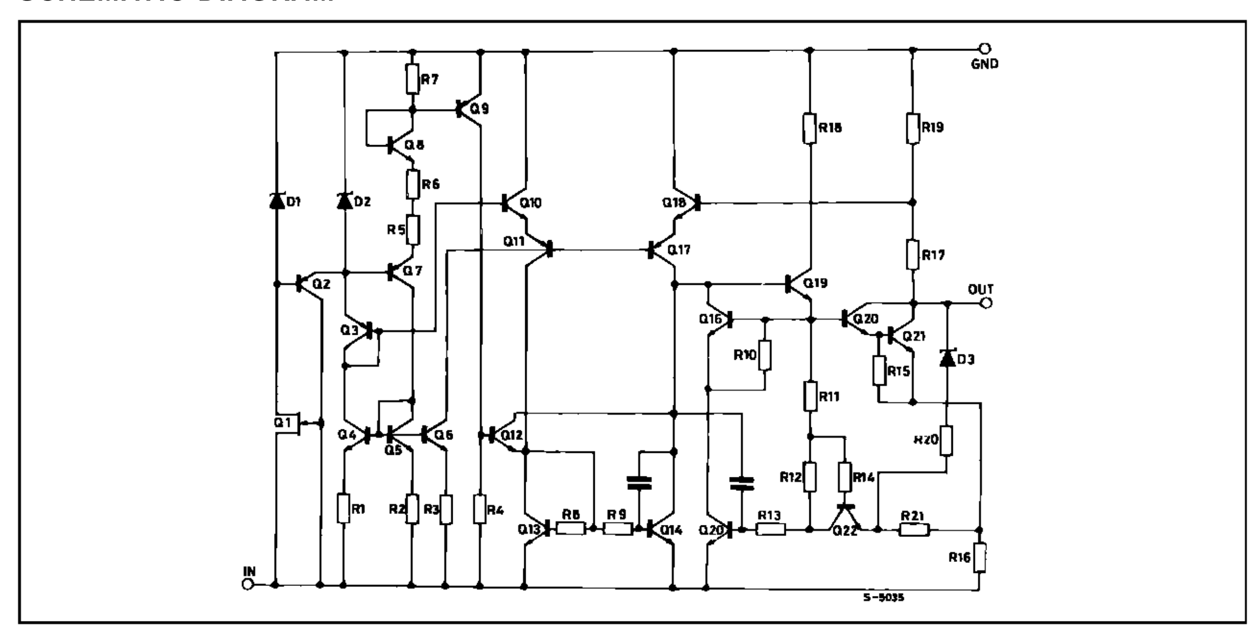
### DESCRIPTION

The L7900 series of three-terminal negative regulators is available in TO-220 and TO-3 packages and with several output voltages. They can provide local on-card regulation, eliminating the distribution problems associated with single point regulation; furthermore, having the same voltage options as the L7800 positive standard series, they are particularly suited for split power supplies. In addition, the –5.2V is also available for ECL system.

If adeguate heatsinking is provided, the L7900 series can deliver an output current in excess of 1.5A. Although designed primarly as fixed voltage regulators, these devices can be used with external components to obtain adjustable voltages and currents.




### SCHEMATIC DIAGRAM



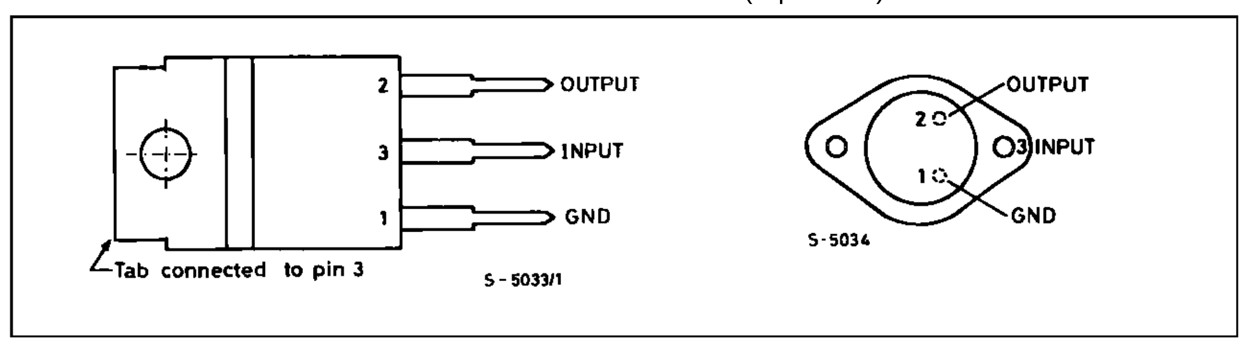
## ABSOLUTE MAXIMUM RATINGS

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_i$ | DC Input Voltage (for $V_o$ = – 5 to – 18V)<br>(for $V_o$ = – 20, – 24V) | – 35<br>– 40 | V<br>V |
| $I_o$ | Output Current | Internally limited | |
| $P_{tot}$ | Total Power Dissipation | Internally limited | |
| $T_{op}$ | Operating Junction Temperature | 0 to + 150 | °C |
| $T_{stg}$ | Storage Temperature | – 65 to + 150 | °C |

## THERMAL DATA

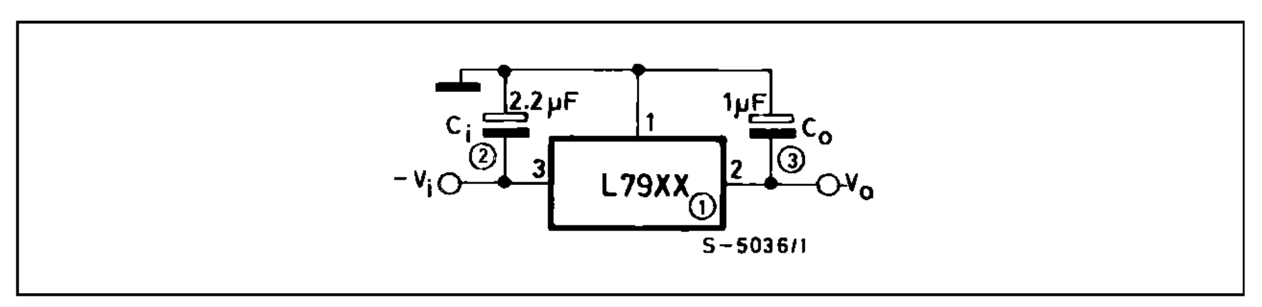
| | | | TO-3 | TO-220 | ISOWATT220 | |
|---|---|---|---|---|---|---|
| $R_{thj\text{-}case}$ | Thermal Resistance Junction-Case | Max | 4 | 3 | 4 | °C/W |
| $R_{thj\text{-}amb}$ | Thermal Resistance Junction-Ambient | Max | 35 | 50 | 60 | °C/W |

## CONNECTION DIAGRAM AND ORDERING NUMBERS (top views)




| TYPE | TO-3 | TO-220 | ISOWATT220 | OUTPUT VOLTAGE |
|---|---|---|---|---|
| L7905C | L7905CT | L7905CV | L7905CP | -5 V |
| L7952C | L7952CT | L7952CV | | -5.2 V |
| L7906C | L7906CT | L7906CV | L7906CP | -6 V |
| L7908C | L7908CT | L7908CV | L7908CP | -8 V |
| L7912C | L7912CT | L7912CV | L7912CP | -12 V |
| L7915C | L7915CT | L7915CV | L7915CP | -15 V |
| L7918C | L7918CT | L7918CV | L7918CP | -18 V |
| L7920C | L7920CT | L7920CV | L7920CP | -20 V |
| L7922C | L7922CT | L7922CV | | -22 V |
| L7924C | L7924CT | L7924CV | L7924CP | -24 V |

## APPLICATION CIRCUIT



**ELECTRICAL CHARACTERISTICS FOR L7905C** (refer to the test circuits, $T_j$ = 0 to 150 °C, $V_i$ = -10V, $I_o$ = 500 mA, $C_i$ = 2.2 µF, $C_o$ = 1 µF unless otherwise specified)

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $V_o$ | Output Voltage | $T_j$ = 25 °C | -4.8 | -5 | -5.2 | V |
| $V_o$ | Output Voltage | $I_o$ = -5 mA to -1 A $P_o \leq$ 15 W<br>$V_i$ = 8 to 20 V | -4.75 | -5 | -5.25 | V |
| $\Delta V_o$* | Line Regulation | $V_i$ = -7 to -25 V $T_j$ = 25 °C<br>$V_i$ = -8 to -12 V $T_j$ = 25 °C | | | 100<br>50 | mV<br>mV |
| $\Delta V_o$* | Load Regulation | $I_o$ = 5 to 1500 mA $T_j$ = 25 °C<br>$I_o$ = 250 to 750 mA $T_j$ = 25 °C | | | 100<br>50 | mV<br>mV |
| $I_d$ | Quiescent Current | $T_j$ = 25 °C | | | 3 | mA |
| $\Delta I_d$ | Quiescent Current Change | $I_o$ = 5 to 1000 mA | | | 0.5 | mA |
| $\Delta I_d$ | Quiescent Current Change | $V_i$ = -8 to -25 V | | | 1.3 | mA |
| $\frac{\Delta V_o}{\Delta T}$ | Output Voltage Drift | $I_o$ = 5 mA | | -0.4 | | mV/°C |
| $e_N$ | Output Noise Voltage | B = 10Hz to 100KHz $T_j$ = 25 °C | | 100 | | µV |
| SVR | Supply Voltage Rejection | $\Delta V_i$ = 10 V f = 120 Hz | 54 | 60 | | dB |
| $V_d$ | Dropout Voltage | $I_o$ = 1 A $T_j$ = 25 °C<br>$\Delta V_O$ = 100 mV | | 1.4 | | V |
| $I_{sc}$ | Short Circuit Current | | | 2.1 | | A |
| $I_{scp}$ | Short Circuit Peak Current | $T_j$ = 25 °C | | 2.5 | | A |

**ELECTRICAL CHARACTERISTICS FOR L7952C** (refer to the test circuits, $T_j$ = 0 to 150 °C, $V_i$ = -10V, $I_o$ = 500 mA, $C_i$ = 2.2 µF, $C_o$ = 1 µF unless otherwise specified)

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $V_o$ | Output Voltage | $T_j$ = 25 °C | -5.0 | -5.2 | -5.4 | V |
| $V_o$ | Output Voltage | $I_o$ = -5 mA to -1 A $P_o \leq$ 15 W<br>$V_i$ = -9 to -21 V | -4.95 | -5.2 | -5.45 | V |
| $\Delta V_o$* | Line Regulation | $V_i$ = -8 to -25 V $T_j$ = 25 °C<br>$V_i$ = -9 to -12 V $T_j$ = 25 °C | | | 105<br>52 | mV<br>mV |
| $\Delta V_o$* | Load Regulation | $I_o$ = 5 to 1500 mA $T_j$ = 25 °C<br>$I_o$ = 250 to 750 mA $T_j$ = 25 °C | | | 105<br>52 | mV<br>mV |
| $I_d$ | Quiescent Current | $T_j$ = 25 °C | | | 3 | mA |
| $\Delta I_d$ | Quiescent Current Change | $I_o$ = 5 to 1000 mA | | | 0.5 | mA |
| $\Delta I_d$ | Quiescent Current Change | $V_i$ = -9 to -25 V | | | 1.3 | mA |
| $\frac{\Delta V_o}{\Delta T}$ | Output Voltage Drift | $I_o$ = 5 mA | | -0.5 | | mV/°C |
| $e_N$ | Output Noise Voltage | B = 10Hz to 100KHz $T_j$ = 25 °C | | 125 | | µV |
| SVR | Supply Voltage Rejection | $\Delta V_i$ = 10 V f = 120 Hz | 54 | 60 | | dB |
| $V_d$ | Dropout Voltage | $I_o$ = 1 A $T_j$ = 25 °C<br>$\Delta V_O$ = 100 mV | | 1.4 | | V |
| $I_{sc}$ | Short Circuit Current | | | 2 | | A |
| $I_{scp}$ | Short Circuit Peak Current | $T_j$ = 25 °C | | 2.5 | | A |

* Load and line regulation are specified at constant junction temperature. Changes in $V_o$ due to heating effects must be taken into account separately. Pulce testing with low duty cycle is used.

**ELECTRICAL CHARACTERISTICS FOR L7906C** (refer to the test circuits, $T_j$ = 0 to 150 $^oC$, $V_i$ = -11V, $I_o$ = 500 mA, $C_i$ = 2.2 μF, $C_o$ = 1 μF unless otherwise specified)

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $V_o$ | Output Voltage | $T_j$ = 25 $^oC$ | -5.75 | -6 | -6.25 | V |
| $V_o$ | Output Voltage | $I_o$ = -5 mA to -1 A $P_o \leq$ 15 W<br>$V_i$ = -9.5 to -21.5 V | -5.7 | -6 | -6.3 | V |
| $\Delta V_o$* | Line Regulation | $V_i$ = -8.5 to -25 V $T_j$ = 25 $^oC$<br>$V_i$ = -9 to -15 V $T_j$ = 25 $^oC$ | | | 120<br>60 | mV<br>mV |
| $\Delta V_o$* | Load Regulation | $I_o$ = 5 to 1500 mA $T_j$ = 25 $^oC$<br>$I_o$ = 250 to 750 mA $T_j$ = 25 $^oC$ | | | 120<br>60 | mV<br>mV |
| $I_d$ | Quiescent Current | $T_j$ = 25 $^oC$ | | | 3 | mA |
| $\Delta I_d$ | Quiescent Current Change | $I_o$ = 5 to 1000 mA | | | 0.5 | mA |
| $\Delta I_d$ | Quiescent Current Change | $V_i$ = -9.5 to -25 V | | | 1.3 | mA |
| $\frac{\Delta V_o}{\Delta T}$ | Output Voltage Drift | $I_o$ = 5 mA | | -0.6 | | mV/$^oC$ |
| $e_N$ | Output Noise Voltage | B = 10Hz to 100KHz $T_j$ = 25 $^oC$ | | 144 | | μV |
| SVR | Supply Voltage Rejection | $\Delta V_i$ = 10 V f = 120 Hz | 54 | 60 | | dB |
| $V_d$ | Dropout Voltage | $I_o$ = 1 A $T_j$ = 25 $^oC$<br>$\Delta V_O$ = 100 mV | | 1.4 | | V |
| $I_{sc}$ | Short Circuit Current | | | 2 | | A |
| $I_{scp}$ | Short Circuit Peak Current | $T_j$ = 25 $^oC$ | | 2.5 | | A |

**ELECTRICAL CHARACTERISTICS FOR L7908C** (refer to the test circuits, $T_j$ = 0 to 150 $^oC$, $V_i$ = -14V, $I_o$ = 500 mA, $C_i$ = 2.2 μF, $C_o$ = 1 μF unless otherwise specified)

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $V_o$ | Output Voltage | $T_j$ = 25 $^oC$ | -7.7 | -8 | -8.3 | V |
| $V_o$ | Output Voltage | $I_o$ = -5 mA to -1 A $P_o \leq$ 15 W<br>$V_i$ = -11.5 to -23 V | -7.6 | -8 | -8.4 | V |
| $\Delta V_o$* | Line Regulation | $V_i$ = -10.5 to -25 V $T_j$ = 25 $^oC$<br>$V_i$ = -11 to -17 V $T_j$ = 25 $^oC$ | | | 160<br>80 | mV<br>mV |
| $\Delta V_o$* | Load Regulation | $I_o$ = 5 to 1500 mA $T_j$ = 25 $^oC$<br>$I_o$ = 250 to 750 mA $T_j$ = 25 $^oC$ | | | 160<br>80 | mV<br>mV |
| $I_d$ | Quiescent Current | $T_j$ = 25 $^oC$ | | | 3 | mA |
| $\Delta I_d$ | Quiescent Current Change | $I_o$ = 5 to 1000 mA | | | 0.5 | mA |
| $\Delta I_d$ | Quiescent Current Change | $V_i$ = -11.5 to -25 V | | | 1.3 | mA |
| $\frac{\Delta V_o}{\Delta T}$ | Output Voltage Drift | $I_o$ = 5 mA | | -0.6 | | mV/$^oC$ |
| $e_N$ | Output Noise Voltage | B = 10Hz to 100KHz $T_j$ = 25 $^oC$ | | 175 | | μV |
| SVR | Supply Voltage Rejection | $\Delta V_i$ = 10 V f = 120 Hz | 54 | 60 | | dB |
| $V_d$ | Dropout Voltage | $I_o$ = 1 A $T_j$ = 25 $^oC$<br>$\Delta V_O$ = 100 mV | | 1.1 | | V |
| $I_{sc}$ | Short Circuit Current | | | 1.5 | | A |
| $I_{scp}$ | Short Circuit Peak Current | $T_j$ = 25 $^oC$ | | 2.5 | | A |

* Load and line regulation are specified at constant junction temperature. Changes in $V_o$ due to heating effects must be taken into account separately. Pulce testing with low duty cycle is used.





**ELECTRICAL CHARACTERISTICS FOR L7912C** (refer to the test circuits, $T_j$ = 0 to 150 $^oC$, $V_i$ = -19V, $I_o$ = 500 mA, $C_i$ = 2.2 µF, $C_o$ = 1 µF unless otherwise specified)

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $V_o$ | Output Voltage | $T_j$ = 25 $^oC$ | -11.5 | -12 | -12.5 | V |
| $V_o$ | Output Voltage | $I_o$ = -5 mA to -1 A $P_o \leq$ 15 W<br>$V_i$ = -15.5 to -27 V | -11.4 | -12 | -12.6 | V |
| $\Delta V_o$* | Line Regulation | $V_i$ = -14.5 to -30 V $T_j$ = 25 $^oC$<br>$V_i$ = -16 to -22 V $T_j$ = 25 $^oC$ | | | 240<br>120 | mV<br>mV |
| $\Delta V_o$* | Load Regulation | $I_o$ = 5 to 1500 mA $T_j$ = 25 $^oC$<br>$I_o$ = 250 to 750 mA $T_j$ = 25 $^oC$ | | | 240<br>120 | mV<br>mV |
| $I_d$ | Quiescent Current | $T_j$ = 25 $^oC$ | | | 3 | mA |
| $\Delta I_d$ | Quiescent Current Change | $I_o$ = 5 to 1000 mA | | | 0.5 | mA |
| $\Delta I_d$ | Quiescent Current Change | $V_i$ = -15 to -30 V | | | 1 | mA |
| $\frac{\Delta V_o}{\Delta T}$ | Output Voltage Drift | $I_o$ = 5 mA | | -0.8 | | mV/$^oC$ |
| $e_N$ | Output Noise Voltage | B = 10Hz to 100KHz $T_j$ = 25 $^oC$ | | 200 | | µV |
| SVR | Supply Voltage Rejection | $\Delta V_i$ = 10 V f = 120 Hz | 54 | 60 | | dB |
| $V_d$ | Dropout Voltage | $I_o$ = 1 A $T_j$ = 25 $^oC$<br>$\Delta V_O$ = 100 mV | | 1.1 | | V |
| $I_{sc}$ | Short Circuit Current | | | 1.5 | | A |
| $I_{scp}$ | Short Circuit Peak Current | $T_j$ = 25 $^oC$ | | 2.5 | | A |

**ELECTRICAL CHARACTERISTICS FOR L7915C** (refer to the test circuits, $T_j$ = 0 to 150 $^oC$, $V_i$ = -23V, $I_o$ = 500 mA, $C_i$ = 2.2 µF, $C_o$ = 1 µF unless otherwise specified)

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $V_o$ | Output Voltage | $T_j$ = 25 $^oC$ | -14.4 | -15 | -15.6 | V |
| $V_o$ | Output Voltage | $I_o$ = -5 mA to -1 A $P_o \leq$ 15 W<br>$V_i$ = -18.5 to -30 V | -14.3 | -15 | -15.7 | V |
| $\Delta V_o$* | Line Regulation | $V_i$ = -17.5 to -30 V $T_j$ = 25 $^oC$<br>$V_i$ = -20 to -26 V $T_j$ = 25 $^oC$ | | | 300<br>150 | mV<br>mV |
| $\Delta V_o$* | Load Regulation | $I_o$ = 5 to 1500 mA $T_j$ = 25 $^oC$<br>$I_o$ = 250 to 750 mA $T_j$ = 25 $^oC$ | | | 300<br>150 | mV<br>mV |
| $I_d$ | Quiescent Current | $T_j$ = 25 $^oC$ | | | 3 | mA |
| $\Delta I_d$ | Quiescent Current Change | $I_o$ = 5 to 1000 mA | | | 0.5 | mA |
| $\Delta I_d$ | Quiescent Current Change | $V_i$ = -18.5 to -30 V | | | 1 | mA |
| $\frac{\Delta V_o}{\Delta T}$ | Output Voltage Drift | $I_o$ = 5 mA | | -0.9 | | mV/$^oC$ |
| $e_N$ | Output Noise Voltage | B = 10Hz to 100KHz $T_j$ = 25 $^oC$ | | 250 | | µV |
| SVR | Supply Voltage Rejection | $\Delta V_i$ = 10 V f = 120 Hz | 54 | 60 | | dB |
| $V_d$ | Dropout Voltage | $I_o$ = 1 A $T_j$ = 25 $^oC$<br>$\Delta V_O$ = 100 mV | | 1.1 | | V |
| $I_{sc}$ | Short Circuit Current | | | 1.3 | | A |
| $I_{scp}$ | Short Circuit Peak Current | $T_j$ = 25 $^oC$ | | 2.3 | | A |

* Load and line regulation are specified at constant junction temperature. Changes in $V_o$ due to heating effects must be taken into account separately. Pulce testing with low duty cycle is used.

**ELECTRICAL CHARACTERISTICS FOR L7918C** (refer to the test circuits, $T_j$ = 0 to 150 °C, $V_i$ = -27V, $I_o$ = 500 mA, $C_i$ = 2.2 µF, $C_o$ = 1 µF unless otherwise specified)

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $V_o$ | Output Voltage | $T_j$ = 25 °C | -17.3 | -18 | -18.7 | V |
| $V_o$ | Output Voltage | $I_o$ = -5 mA to -1 A $P_o \leq$ 15 W<br>$V_i$ = -22 to -33 V | -17.1 | -18 | -18.9 | V |
| $\Delta V_o$* | Line Regulation | $V_i$ = -21 to -33 V $T_j$ = 25 °C<br>$V_i$ = -24 to -30 V $T_j$ = 25 °C | | | 360<br>180 | mV<br>mV |
| $\Delta V_o$* | Load Regulation | $I_o$ = 5 to 1500 mA $T_j$ = 25 °C<br>$I_o$ = 250 to 750 mA $T_j$ = 25 °C | | | 360<br>180 | mV<br>mV |
| $I_d$ | Quiescent Current | $T_j$ = 25 °C | | | 3 | mA |
| $\Delta I_d$ | Quiescent Current Change | $I_o$ = 5 to 1000 mA | | | 0.5 | mA |
| $\Delta I_d$ | Quiescent Current Change | $V_i$ = -22 to -33 V | | | 1 | mA |
| $\frac{\Delta V_o}{\Delta T}$ | Output Voltage Drift | $I_o$ = 5 mA | | -1 | | mV/°C |
| $e_N$ | Output Noise Voltage | B = 10Hz to 100KHz $T_j$ = 25 °C | | 300 | | µV |
| SVR | Supply Voltage Rejection | $\Delta V_i$ = 10 V f = 120 Hz | 54 | 60 | | dB |
| $V_d$ | Dropout Voltage | $I_o$ = 1 A $T_j$ = 25 °C<br>$\Delta V_O$ = 100 mV | | 1.1 | | V |
| $I_{sc}$ | Short Circuit Current | | | 1.1 | | A |
| $I_{scp}$ | Short Circuit Peak Current | $T_j$ = 25 °C | | 2.2 | | A |

**ELECTRICAL CHARACTERISTICS FOR L7920C** (refer to the test circuits, $T_j$ = 0 to 150 °C, $V_i$ = -29V, $I_o$ = 500 mA, $C_i$ = 2.2 µF, $C_o$ = 1 µF unless otherwise specified)

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $V_o$ | Output Voltage | $T_j$ = 25 °C | -19.2 | -20 | -20.8 | V |
| $V_o$ | Output Voltage | $I_o$ = -5 mA to -1 A $P_o \leq$ 15 W<br>$V_i$ = -24 to -35 V | -19 | -20 | -21 | V |
| $\Delta V_o$* | Line Regulation | $V_i$ = -23 to -35 V $T_j$ = 25 °C<br>$V_i$ = -26 to -32 V $T_j$ = 25 °C | | | 400<br>200 | mV<br>mV |
| $\Delta V_o$* | Load Regulation | $I_o$ = 5 to 1500 mA $T_j$ = 25 °C<br>$I_o$ = 250 to 750 mA $T_j$ = 25 °C | | | 400<br>200 | mV<br>mV |
| $I_d$ | Quiescent Current | $T_j$ = 25 °C | | | 3 | mA |
| $\Delta I_d$ | Quiescent Current Change | $I_o$ = 5 to 1000 mA | | | 0.5 | mA |
| $\Delta I_d$ | Quiescent Current Change | $V_i$ = -24 to -35 V | | | 1 | mA |
| $\frac{\Delta V_o}{\Delta T}$ | Output Voltage Drift | $I_o$ = 5 mA | | -1.1 | | mV/°C |
| $e_N$ | Output Noise Voltage | B = 10Hz to 100KHz $T_j$ = 25 °C | | 350 | | µV |
| SVR | Supply Voltage Rejection | $\Delta V_i$ = 10 V f = 120 Hz | 54 | 60 | | dB |
| $V_d$ | Dropout Voltage | $I_o$ = 1 A $T_j$ = 25 °C<br>$\Delta V_O$ = 100 mV | | 1.1 | | V |
| $I_{sc}$ | Short Circuit Current | | | 0.9 | | A |
| $I_{scp}$ | Short Circuit Peak Current | $T_j$ = 25 °C | | 2.5 | | A |

* Load and line regulation are specified at constant junction temperature. Changes in $V_o$ due to heating effects must be taken into account separately. Pulce testing with low duty cycle is used.





**ELECTRICAL CHARACTERISTICS FOR L7922C** (refer to the test circuits, $T_j$ = 0 to 150 °C, $V_i$ = -31V, $I_o$ = 500 mA, $C_i$ = 2.2 µF, $C_o$ = 1 µF unless otherwise specified)

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $V_o$ | Output Voltage | $T_j$ = 25 °C | -21.1 | -22 | -22.9 | V |
| $V_o$ | Output Voltage | $I_o$ = -5 mA to -1 A  $P_o \leq$ 15 W<br>$V_i$ = -26 to -37 V | -20.9 | -22 | -23.1 | V |
| $\Delta V_o$* | Line Regulation | $V_i$ = -25 to -37 V  $T_j$ = 25 °C<br>$V_i$ = -28 to -34 V  $T_j$ = 25 °C | | | 440<br>220 | mV<br>mV |
| $\Delta V_o$* | Load Regulation | $I_o$ = 5 to 1500 mA  $T_j$ = 25 °C<br>$I_o$ = 250 to 750 mA  $T_j$ = 25 °C | | | 440<br>220 | mV<br>mV |
| $I_d$ | Quiescent Current | $T_j$ = 25 °C | | | 3 | mA |
| $\Delta I_d$ | Quiescent Current Change | $I_o$ = 5 to 1000 mA | | | 0.5 | mA |
| $\Delta I_d$ | Quiescent Current Change | $V_i$ = -26 to -37 V | | | 1 | mA |
| $\frac{\Delta V_o}{\Delta T}$ | Output Voltage Drift | $I_o$ = 5 mA | | -1.1 | | mV/°C |
| $e_N$ | Output Noise Voltage | B = 10Hz to 100KHz  $T_j$ = 25 °C | | 375 | | µV |
| SVR | Supply Voltage Rejection | $\Delta V_i$ = 10 V  f = 120 Hz | 54 | 60 | | dB |
| $V_d$ | Dropout Voltage | $I_o$ = 1 A  $T_j$ = 25 °C<br>$\Delta V_O$ = 100 mV | | 1.1 | | V |
| $I_{sc}$ | Short Circuit Current | | | 1.1 | | A |
| $I_{scp}$ | Short Circuit Peak Current | $T_j$ = 25 °C | | 2.2 | | A |

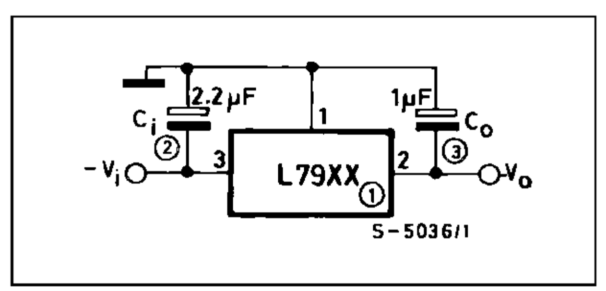
**ELECTRICAL CHARACTERISTICS FOR L7924C** (refer to the test circuits, $T_j$ = 0 to 150 °C, $V_i$ = -33V, $I_o$ = 500 mA, $C_i$ = 2.2 µF, $C_o$ = 1 µF unless otherwise specified)

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $V_o$ | Output Voltage | $T_j$ = 25 °C | -23 | -24 | -25 | V |
| $V_o$ | Output Voltage | $I_o$ = -5 mA to -1 A  $P_o \leq$ 15 W<br>$V_i$ = -27 to -38 V | -22.8 | -24 | -25.2 | V |
| $\Delta V_o$* | Line Regulation | $V_i$ = -27 to -38 V  $T_j$ = 25 °C<br>$V_i$ = -30 to -36 V  $T_j$ = 25 °C | | | 480<br>240 | mV<br>mV |
| $\Delta V_o$* | Load Regulation | $I_o$ = 5 to 1500 mA  $T_j$ = 25 °C<br>$I_o$ = 250 to 750 mA  $T_j$ = 25 °C | | | 480<br>240 | mV<br>mV |
| $I_d$ | Quiescent Current | $T_j$ = 25 °C | | | 3 | mA |
| $\Delta I_d$ | Quiescent Current Change | $I_o$ = 5 to 1000 mA | | | 0.5 | mA |
| $\Delta I_d$ | Quiescent Current Change | $V_i$ = -27 to -38 V | | | 1 | mA |
| $\frac{\Delta V_o}{\Delta T}$ | Output Voltage Drift | $I_o$ = 5 mA | | -1 | | mV/°C |
| $e_N$ | Output Noise Voltage | B = 10Hz to 100KHz  $T_j$ = 25 °C | | 400 | | µV |
| SVR | Supply Voltage Rejection | $\Delta V_i$ = 10 V  f = 120 Hz | 54 | 60 | | dB |
| $V_d$ | Dropout Voltage | $I_o$ = 1 A  $T_j$ = 25 °C<br>$\Delta V_O$ = 100 mV | | 1.1 | | V |
| $I_{sc}$ | Short Circuit Current | | | 1.1 | | A |
| $I_{scp}$ | Short Circuit Peak Current | $T_j$ = 25 °C | | 2.2 | | A |

* Load and line regulation are specified at constant junction temperature. Changes in $V_o$ due to heating effects must be taken into account separately. Pulce testing with low duty cycle is used.

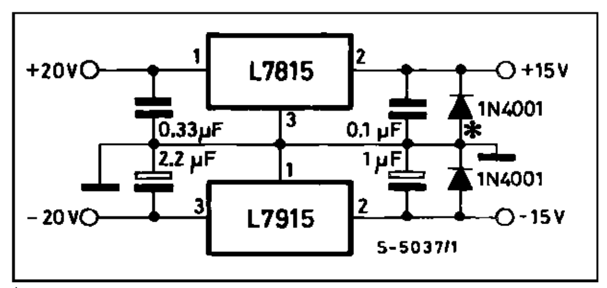
## APPLICATION INFORMATION

**Figure 1 :** Fixed Output Regulator.



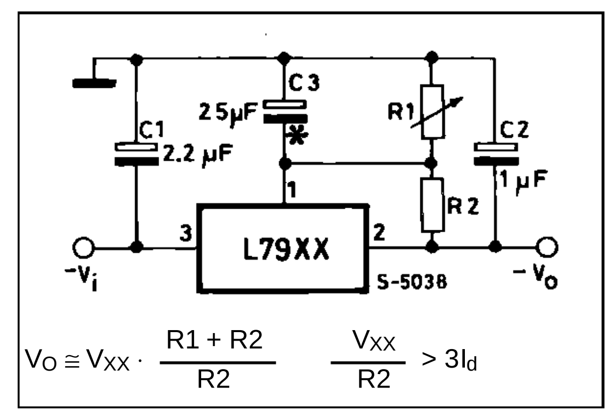

**Notes :** 1. To specify an output voltage, substitute voltage value for "XX".
2. Required for stability. For value given, capacitor must be solid tantalum. If aluminium electrolitics are used, at least ten times value should be selected. $C_1$ is required if regulator is located an appreciable distance from power supply filter.
3. To improve transient response. If large capacitors are used, a high current diode from input to output (1N4001 or similar) should be introduced to protect the device from momentary input short circuit.

**Figure 2 :** Split Power Supply (± 15V/1A).




* Against potential latch-up problems.

**Figure 3 :** Circuit for Increasing Output Voltage.




$$V_O \cong V_{XX} \cdot \frac{R1 + R2}{R2} \qquad \frac{V_{XX}}{R2} > 3I_d$$

* C3 Optional for improved transient response and ripple rejection.

**Figure 4 :** High Current Negative Regulator (– 5V/4A with 5A current limiting).

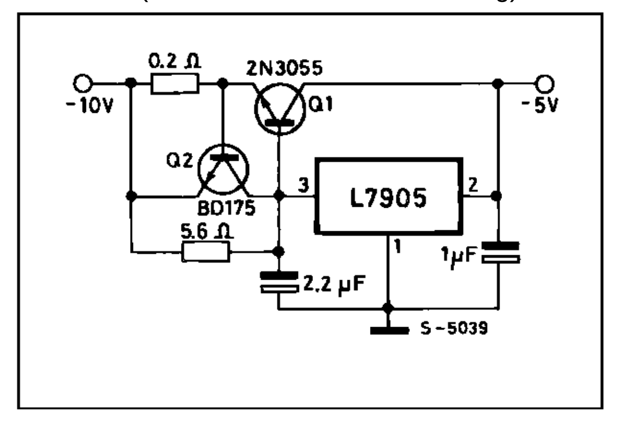
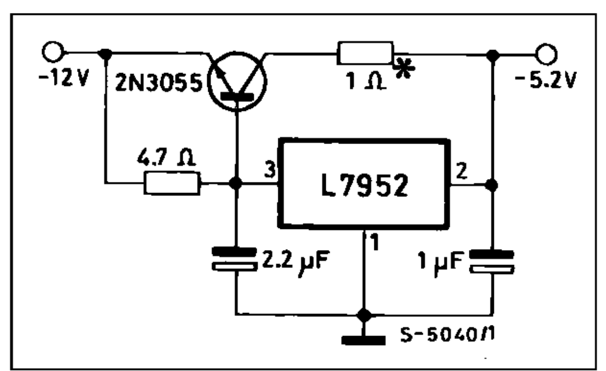


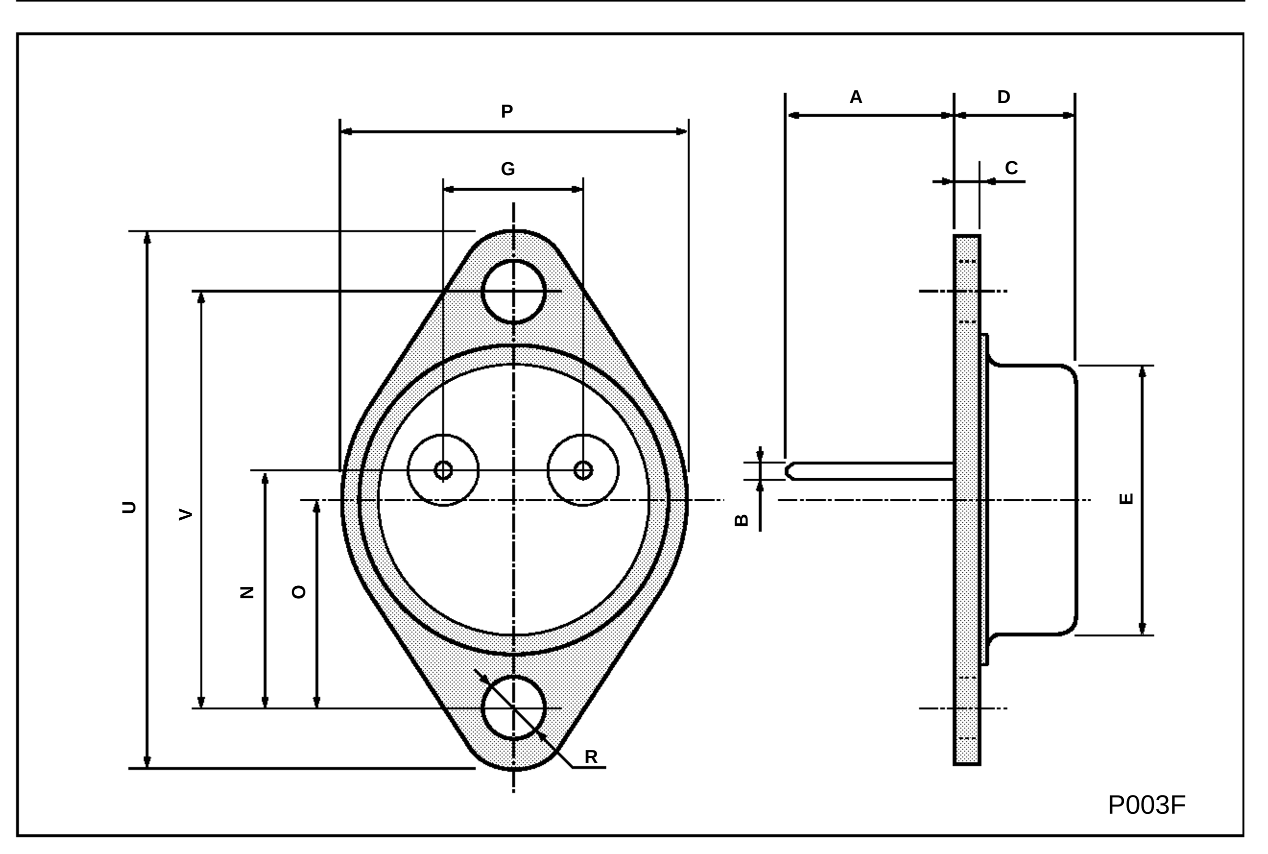

**Figure 5 :** Typical ECL System Power Supply (– 5.2V/4A).




* Optional dropping resistor to reduce the power dissipated in the boost transistor.

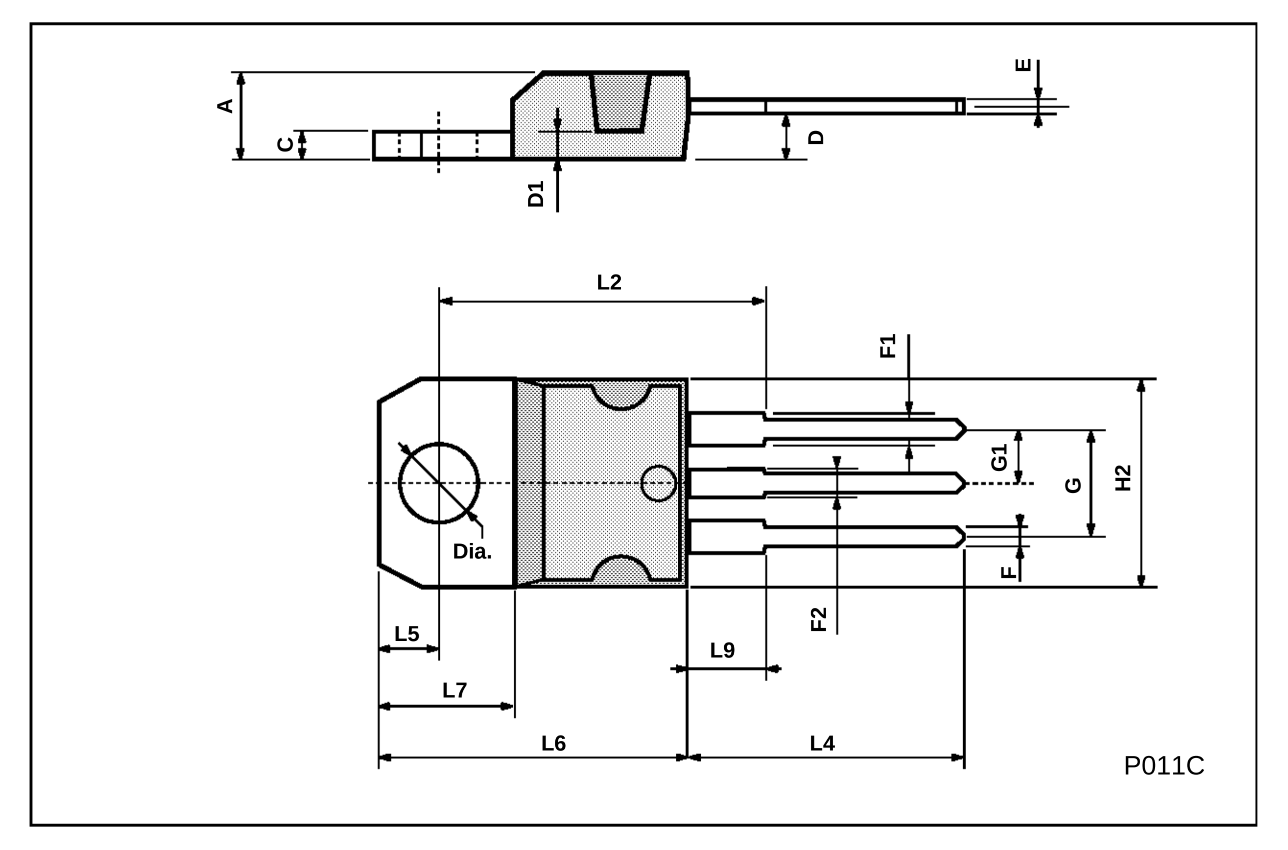
## TO-3 MECHANICAL DATA

| DIM. | mm | | | inch | | |
|---|---|---|---|---|---|---|
| | MIN. | TYP. | MAX. | MIN. | TYP. | MAX. |
| A | 11.00 | | 13.10 | 0.433 | | 0.516 |
| B | 0.97 | | 1.15 | 0.038 | | 0.045 |
| C | 1.50 | | 1.65 | 0.059 | | 0.065 |
| D | 8.32 | | 8.92 | 0.327 | | 0.351 |
| E | 19.00 | | 20.00 | 0.748 | | 0.787 |
| G | 10.70 | | 11.10 | 0.421 | | 0.437 |
| N | 16.50 | | 17.20 | 0.649 | | 0.677 |
| P | 25.00 | | 26.00 | 0.984 | | 1.023 |
| R | 4.00 | | 4.09 | 0.157 | | 0.161 |
| U | 38.50 | | 39.30 | 1.515 | | 1.547 |
| V | 30.00 | | 30.30 | 1.187 | | 1.193 |



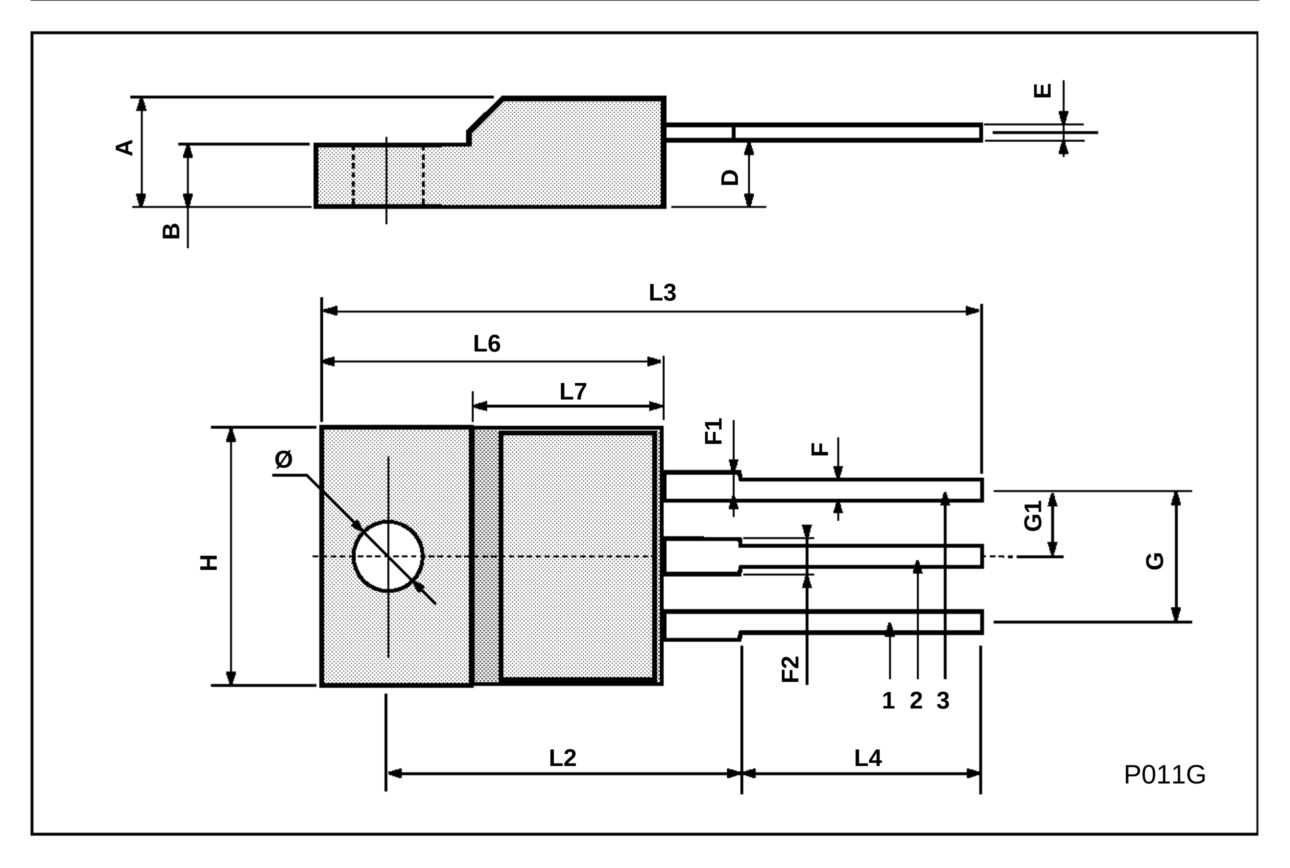
## TO-220 MECHANICAL DATA

| DIM. | mm | | | inch | | |
|---|---|---|---|---|---|---|
| | MIN. | TYP. | MAX. | MIN. | TYP. | MAX. |
| A | 4.40 | | 4.60 | 0.173 | | 0.181 |
| C | 1.23 | | 1.32 | 0.048 | | 0.051 |
| D | 2.40 | | 2.72 | 0.094 | | 0.107 |
| D1 | | 1.27 | | | 0.050 | |
| E | 0.49 | | 0.70 | 0.019 | | 0.027 |
| F | 0.61 | | 0.88 | 0.024 | | 0.034 |
| F1 | 1.14 | | 1.70 | 0.044 | | 0.067 |
| F2 | 1.14 | | 1.70 | 0.044 | | 0.067 |
| G | 4.95 | | 5.15 | 0.194 | | 0.203 |
| G1 | 2.4 | | 2.7 | 0.094 | | 0.106 |
| H2 | 10.0 | | 10.40 | 0.393 | | 0.409 |
| L2 | | 16.4 | | | 0.645 | |
| L4 | 13.0 | | 14.0 | 0.511 | | 0.551 |
| L5 | 2.65 | | 2.95 | 0.104 | | 0.116 |
| L6 | 15.2 | | 15.9 | 0.598 | | 0.625 |
| L7 | 6.2 | | 6.6 | 0.244 | | 0.260 |
| L9 | 3.5 | | 4.2 | 0.137 | | 0.165 |
| DIA. | 3.75 | | 3.85 | 0.147 | | 0.151 |



## ISOWATT220 MECHANICAL DATA

| DIM. | mm | | | inch | | |
|---|---|---|---|---|---|---|
| | MIN. | TYP. | MAX. | MIN. | TYP. | MAX. |
| A | 4.4 | | 4.6 | 0.173 | | 0.181 |
| B | 2.5 | | 2.7 | 0.098 | | 0.106 |
| D | 2.5 | | 2.75 | 0.098 | | 0.108 |
| E | 0.4 | | 0.7 | 0.015 | | 0.027 |
| F | 0.75 | | 1 | 0.030 | | 0.039 |
| F1 | 1.15 | | 1.7 | 0.045 | | 0.067 |
| F2 | 1.15 | | 1.7 | 0.045 | | 0.067 |
| G | 4.95 | | 5.2 | 0.195 | | 0.204 |
| G1 | 2.4 | | 2.7 | 0.094 | | 0.106 |
| H | 10 | | 10.4 | 0.393 | | 0.409 |
| L2 | | 16 | | | 0.630 | |
| L3 | 28.6 | | 30.6 | 1.126 | | 1.204 |
| L4 | 9.8 | | 10.6 | 0.385 | | 0.417 |
| L6 | 15.9 | | 16.4 | 0.626 | | 0.645 |
| L7 | 9 | | 9.3 | 0.354 | | 3.66 |
| Ø | 3 | | 3.2 | 0.118 | | 0.126 |




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